

**UNITED STATES PATENT APPLICATION**

of

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for

**SIDE FRAME STRUCTURE**

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## SIDE FRAME STRUCTURE

### CROSS-REFERENCE TO RELATED APPLICATIONS

[001] This application claims benefit from and priority to Chinese Application 02270594.5, filed November 2, 2002 and entitled “Plastic Folding Table with Modified Side Frame Structure,” which application is incorporated herein by reference in its entirety.

### BACKGROUND OF THE INVENTION

#### The Field of the Invention

[002] This utility model relates to an improved side frame connecting structure for use in support structures such as, but not limited to, tables and chairs.

#### The Relevant Technology

[003] Various types of support structures, including, but not limited to, tables and chairs, have incorporated support surfaces constructed of hollow plastic. Support surfaces include table tops, chair backs, chair seats, and the like. Advantageously, plastic support surfaces are easy to form, generally resulting in lower manufacturing costs. In addition, plastic support surfaces are easy to form into foldable structures, easy to transport, and also easy to clean. Plastic support surfaces can also be configured to connect to a support leg such as a table leg or chair leg. Generally, this has required the use of a connecting structure.

[004] One typically method for connecting a support surface to a support leg includes forming a side frame structure on the bottom of the support surface and attaching a connecting structure thereto. The support leg can then be connected to the connecting structure. Figure 4 depicts an example of a conventional connection between a plastic table top and a table leg. Figure 4 depicts a cross section of a table

top 1'. The edge of table top 1' has an outside ridge or lip which extends outwardly from the bottom surface of the table top. In addition, a raised portion 11' is formed to provide a connection region for the table top 1' and connector 3'.

[005] Connector 3' is a U-shaped structure generally conforming to the shape of raised portion 11'. Connector 3' has a recessed groove 31' which is configured to engage the raised portion 11'. Connector 3' also has a pair of extensions which are configured to connected the connector 3' to table top 1' via a pair of lugs 32'. Thus, recessed groove 31' covers the raised portion 11' on the underside of the matching table top 1'. Thereafter, connector 3' is connected to one or more table legs.

[006] The connection shown in Figure 4 is intended to increase the connection strength between the table top and the table legs. However, the height of the raised portion 11' of the underside of the table top 1' does not always match the depth of the recessed groove 31' of connector 3'. The connector 3' is cold-molded, and therefore, its dimensions are affected by a number of factors.

[007] As shown in Figure 5, when the height of the raised portion 11' is greater than the depth of the recessed groove 31', a space is formed between the lugs 32' at both sides of the connector 3' and the table top 1'. Not only does this cause compression on raised portion 11', but a torque force will also be applied to the lugs 32' at both sides of the connector 3'. This produces an instable connection between table top 1' and connector 3' which results in instability between the connector 3' and corresponding table leg.

[008] Similarly, as shown in Figure 6, when the height of the raised portion 11' is smaller than the depth of the recessed groove 31', a gap is formed between the top of

the raised portion 11' and the recessed groove 31'. This, too, results in instability between the table top 1', connector 3', and corresponding table leg.

[009] It would thus be an advantage to have a connector structure which provides increased strength and stability between a plastic support surface and a corresponding support leg.

## SUMMARY OF THE INVENTION

[0010] A need, therefore, exists for connecting structures that eliminate the above-described disadvantages and problems. While examples of the invention are described with reference to a table, it will be appreciated that the connecting structure of the present invention may be implemented in any support structure such as, but not limited to, tables, chairs, storage structures, and the like.

[0011] In one aspect of the invention, a table is provided including a plastic table top comprising a top surface and a bottom surface, the table top comprising a raised portion extending outwardly from the bottom surface of the table top, the raised portion comprising a horizontal portion, a first side wall and a second side wall; a connector configured to be secured to at least a portion of the raised portion of the table top, the connector comprising a horizontal portion and a first vertical portion, wherein the length of the first vertical portion of the connector is less than the height of at least one of the first and second side wall of the raised portion; and a first table leg connected to the connector near an end thereof.

[0012] Having a connector in which the vertical portion(s) does not touch the table top avoids the possibility of added compression and/or torque forces on the raised portion and/or components of the connector which would weaken the connecting structure.

[0013] The connector may further include a second vertical portion opposing the first vertical portion, wherein the length of the second vertical portion of the connector is less than the height of at least one of the first and second side wall of the raised portion.

[0014] The connector may have an L-shaped cross-section.

- [0015] The connector may have a U-shaped cross-section.
- [0016] The raised portion may include an elongate structure which is substantially the same length as the table top.
- [0017] The connector may include an elongate structure which is substantially the same length as the table top.
- [0018] The connector may substantially conform to at least a portion of the outer surface of the raise portion.
- [0019] The plastic table top may be formed from a blow-molded plastic construction.
- [0020] The first table leg may be pivotally connected to the connector.
- [0021] The table may also include a second table leg pivotally connected to the connector near an opposing end thereof.
- [0022] In one aspect of the invention, the vertical portion(s) of the connector is shorter in length than the height of the raised portion. Thus, when the connector is secured to the raised portion, a tight interface is formed between the connector and the raised portion along substantially the entire length thereof. In addition, because the vertical portion of the connector does not touch the table top, the raised portion does not experience compression and/or torque forces that can happen in conventional connecting structures. In addition, the connector uses less material than conventional connectors, and is of simplistic design, thus reducing manufacturing cost and steps. At the same time, the connector provides added strength to the connection between table top and a table leg, which is stable and reliable.

[0023] These and other advantages and features of the present invention will become more fully apparent from the following description and appended claims, or may be learned by the practice of the invention as set forth hereinafter.

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## BRIEF DESCRIPTION OF THE DRAWINGS

[0024] To further clarify the above and other advantages and features of the present invention, a more particular description of the invention will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. It is appreciated that these drawings depict only typical embodiments of the invention and are therefore not to be considered limiting of its scope. The invention will be described and explained with additional specificity and detail through the use of the accompanying drawings, in which:

[0025] Figure 1 is a fragmentary cross-sectional diagram of one embodiment of the present invention.

[0026] Figure 2 is a an exploded perspective drawings of one embodiment of the present invention

[0027] Figure 3 is a fragmentary cross-sectional diagram of another embodiment of the present invention.

[0028] Figure 4 is a fragmentary cross-sectional diagram of a conventional table top.

[0029] Figure 5 is a fragmentary cross-sectional diagram of a conventional table top.

[0030] Figure 6 is a fragmentary cross-sectional diagram of a conventional table top.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0031] The present invention is generally directed to improved connector structures for use in various support structures which provide connection between a support surface and a support leg. Such support structures may include, but are not limited to, table, chairs, storage structures, and the like. However, for purposes of describing features of the present invention, described embodiments will be directed to a table structure.

[0032] Figure 1 and 2 illustrate one embodiment of a table incorporating aspects of the present invention. The table includes a table top 1 having a top surface and a bottom surface. In one embodiment, the table top 1 is a hollow plastic table top 1. In one embodiment, table top 1 includes an outer ridge extending outwardly from the bottom surface of the table top and disposed at the outer periphery thereof. The table top 1 also includes a pair of elongate raised portions 11 disposed on both sides of the bottom surface of the table top and spaced apart from the outer ridge. While raised portion 11 is shown as an elongate structure, raised portion 11 may also be formed as one or more shorter raised portions 11 which are disposed at opposing ends of the table top 1.

[0033] As shown in Figure 2, the table includes table legs 2 which are connected to the table using a connector 3. The connector 3 covers at least a portion of raised portion 11, and is secured thereto. The connector 3 is secured to the raised portion 11 by one or more bolts or lugs disposed at regular intervals along the length of connector 3. The ends of the table legs 2 are connected to the table top 1 through the connector 3. In one embodiment, the table legs 2 are pivotally connected to the connector 3 to form a folding table. While connector 3 is shown as an elongate structure, connector 3 may

also be formed as one or more shorter connectors which are secured to raised portion 11, whether disposed at opposing ends of an elongate raised portion 11, or disposed on discrete raised portions 11 formed at opposing ends of table top 1.

[0034] With reference to Figure 1, connector 3 is shown in further detail. In one embodiment (Figure 1), the cross-section of connector 3 is L-shaped. In another embodiment (Figure 3), connector 3 has a U-shaped cross-section. Generally, the connector 3 has a horizontal portion and a vertical portion 31. As shown in Figure 1, the connector 3 is disposed over at least a portion of the horizontal portion and a side of the raised portion 11. Thus disposed, connector 3 is positioned to receive an end of a table leg. The connector 3 substantially conforms to the outer contours of the raised portion 11. The tight interface between connector 3 and raised portion 11 does not warp as in conventional support structures. Thus, the connector 3 interfaces with the raised portion 11 along the entire length of the connector 3 so that the strengthening affect of the connector 3 is not weakened.

[0035] The length of the vertical portion 31 of connector 3 is less than the height of raised portion 11 such that the connector 3 never touches the table top 1. Therefore, after the connector 3 is installed, no torque is produced and no compression is placed on the raised portion 11. In addition, because the connector 3 uses less material than connectors of the conventional art, manufacturing costs are decreased.

[0036] As shown in Figure 3, another embodiment of connector 3 is illustrated. In this embodiment, connector 3 has a U-shaped cross-section having a recessed portion 31 which is configured to matingly engage the outer surface of the raised portion 11. The connector 3 thus has two opposing vertical portions which are configured to be shorter than the height of the raised portion 11. Thus, because the connector does not

touch the table top 1, the raised portion 11 will not experience torque and/or compression forces that conventional support surfaces may experience. The connector 3 may be secured to the raised portion 11 by lugs or bolts disposed through each vertical portion of the connector 3 or by a single lug which spans both vertical portions of the connector 3.

[0037] The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.